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Methods of Seeding

November 1, 1939

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SUPPLEMENT TO ARTIFICIAL SEEDING WORKING PLAN OF  
OCTOBER 15, 1938.

General: The seeding tests initiated in October 1938 had two primary objectives: (a) To try out the effectiveness of surface scalping in relation to seedling survival and growth; and (b) to find out how much time of removal of cones affects seedlings losses ~~from~~ due to rodent depredations. Secondary objectives were the testing of location or aspect differences and of cone size.

With the exception of the Elk Creek North slope plot, rodent depredations and drought and heat losses were so severe that there are not enough spots left to make further observations worthwhile. Since the plots are nicely staked out, and the old scalps still good if freshened up a bit, it appears desirable to reseed them this fall to see whether another year will yield more promising results. However, the test should be modified to a certain extent, to obtain new and possibly more useful information. A straight repetition of the 1938 test is not apt to yield important differences especially in regard to screen removal time. It has been established pretty well by now that rodents will eat seeds and seedlings in the spring and early summer and may eat them later on, but that losses ~~xxxxxxxx~~ from late July may be reasonably light and not serious except in localized spots.

It may not be possible to get accurate pictures of losses of older seedlings from small experimental plots if such losses are due to rabbits, porcupine, and other similar rodents.

locality  
The main problem in this/~~region~~ is to provide protection against mice, ground squirrels, chipmunks, pine squirrels, and the like. One should be able to get reliable indications on such a problem even from small plots.

It has not been established how beneficial or harmful is the cone protection to the seedling survival and development. Off-hand it looks that some benefit accrues from leaving the cones on the seedlings where crowding against the screen is not too great. This is particularly true in regard to the large cones. In the small cones there is considerable crowding by the end of the first growing season, causing curling of needles, etc. Whether this effect wears off rapidly after cones are removed is something worth finding out. Since it is almost certain that seedlings would suffer from early cone removal, it is recommended that the first date of removal be postponed till, say, the end of July. On this basis the removal dates for the 1939 test would be as follows:

1. Immediately , i.e., no cones: This is necessary for control purposes  
altho it is fairly certain that essentially complete loss will result.
2. Late July or first of August: This should cut down rodent losses to a minimum and yet allow some recuperation from crowding and permit heat injury if screen shade is significant.
3. The first autumn: This will expose a fresh batch for winter snows.
4. The early spring of the second growing season: This will expose winter protected seedlings and give them full freedom for the second growing season.
5. The end of the second growing season: This will expose a fresh

batch for the second winter and will give an indication as to harmful or beneficial effects of a second season of protection. In the case of the small cones, this will doubtless cause fairly heavy suppression, but the test may be worthwhile in view of the possibility that in actual practise cones may be left accidentally or by force of circumstances for more than the first growing season.

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6. Early spring of/~~second~~ growing season: This should give a good idea of the effect of an additional winter of protection. The present set-up allows a sixth removal only in the case of the large cones.

It might be more informative to make one removal in early July of the first growing season and another one in early August/to get a better idea on heat losses. That is something that could be changed even after the experiment is underway.

Another innovation that appears worthy of trial is the addition of fertilizer to part of the spots. The fertilizer is a mixture of a 1-1-1 mixture of muriate of potash, sulphate of ammonia, and treble super phosphate and well rotted barnyard manure in the ratio of 3 ~~in~~ parts of the commercial mixture to 4 parts of manure. The addition of manure appeared desirable as a soil amendment particularly on soils like that on flat plot on Granite Creek. (More later about reasons for choice of ~~man~~ this combination.) The fertilizer would be applied to five spots per row, top five or bottom five being assigned at random to the fertilizer treatment.

Other changes from the first seeding are as follows:

1. A scooping of soil to make a shallow depression over which the cone can be set. This should minimize frost heave <sup>damage</sup> with the large cones

it will be ~~an~~<sup>a</sup> possible to pile/considerable amount of dirt along the edges to make it more difficult for rodents to knock over any cones.

2. A pin in the small cones to be thrust vertically from the apex down until the loop contacts the cone. This may stabilize the small cones but may not cause perching as did the use of two pins thrust on each side.

~~Afx~~ A further variable that would be desirable to try out is that of varying the density of sowing. Last fall, the sowing was generally too dense. In some instances as many as 60 seedlings were found in one spot indicating that someone had been pouring it on. The thimble was designed to sow about 20 seeds plus or minus 5 according to variation in size of seed. A thimble designed to sow not more than fifteen will be used this year. ~~Mess~~ ease in counting seedlings ~~after~~ in the various inspections ~~xxxxx~~ should not be the guide for density of sowing, but the amount of suppression from large numbers may be a factor in subsequent mortality. Since fresh seed is being sown and since the soundness of this lot has been accurately determined, it is recommended that a maximum of 15 seeds per spots be sown now, and the density variable be left to a future date. In the fall of 1940 when the catch is accurately known a thinning schedule can be superimposed on this experiment and will serve to indicate at least to what extent thinnings are feasible and useful.

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